NAVIGATION APPARATUS CAPABLE OF GENERATING

AND DISPLAYING INFORMATION AND METHOD THEREFOR

BACKGROUND OF THE INVENTION

5   Field of the Invention

The present invention relates to a navigation apparatus capable of information display and a method therefor.

Related Background Art

10   In the conventional navigation apparatus, in case of dynamically generating and displaying a page or executing a time-consuming process in the server, there is often encountered a situation where a long time is required for generating data of which loading is

15   requested to the server, so that the loading operation cannot be conducted immediately. In such case, the process is conventionally continued either by awaiting the completion of the process or by the following method (1) or (2) or the combination thereof:

20   (1) executing the loading operation again manually. The user requests the loading again, then there is confirmed whether the data generation has been completed in response to the request, and, if completed, the data loading is started:

25   (2) executing inspection periodically. Confirmation whether the data generation has been completed is made periodically, for example at an

interval of 1 to 60 seconds, and, if completed, the data loading is started.

However, such conventional method (1) is associated with a drawback that, if the loading operation is requested before the completion of data generation, the loading operation cannot be executed as the process is interrupted for example by a time-out.

Also the conventional method (2) is associated with a drawback of increasing the load of the server receiving the communication or of the data communication channel such as a network.

The conventional method (2) is further associated with another drawback that will be explained with reference to Figs. 6A and 6B.

Fig. 6A shows a configuration of periodically issuing requests for data loading at a short interval, wherein 611, 612 and 613 indicate requests for data loading. If the requests for data loading are issued at such short interval, requests such as 611, 612 are issued uselessly before the data preparation is completed.

Fig. 6B shows a configuration of periodically issuing requests for data loading at a long interval, wherein 620 indicates a request for data loading. If the requests for data are issued at such long interval, an idle time 621 is generated from the data generation to the issuance of the request 620 for data loading,

whereby the data loading is delayed.

SUMMARY OF THE INVENTION

In consideration of the foregoing, an object of
the present invention is to provide an efficient
information display apparatus capable, in case of
loading the data generated in a server, of loading the
data promptly after the generation thereof without
wasteful request for data loading, and a method
therefor.

Another object of the present invention is to
provide an information display apparatus capable of
reducing the load in the server or in the data
communication channel in case of loading the data
generated in the server, and a method therefor.

According to one aspect, the present invention
which achieves these objectives relates to a data
processing method comprising a reception step of
receiving a request for data loading from a terminal,
an end discrimination step of discriminating whether
the generation of requested data is ended, a first
transmission step adapted, if the generation of the
requested data is ended, to transmit such data, an
estimation step adapted, if the generation of the
requested data is not ended, to estimate the end time,
and a second transmission step of transmitting the
estimated end time together with display information

indicating that the data generation is in progress.

According to another aspect, the present invention which achieves these objectives relates to a data processing method comprising an issuing step of issuing a request for data loading to a server, a display step of displaying display data received in response to the request, and a re-issuing step adapted, in case the estimated end time of data generation is received together with the display data, to re-issue the request for data loading when such end time is reached.

According to yet another aspect, the present invention which achieves these objectives relates to a data processing apparatus comprising reception means for receiving a request for data loading from a terminal, end discrimination means for discriminating whether the generation of the requested data is ended, first transmission means adapted, if the generation of the requested data is ended, to transmit such data, estimation means for estimating an end time if the generation of the requested data is not ended, and second transmission means for transmitting the estimated end time together with display information indicating that the data generation is in progress.

According to still another aspect, the present invention which achieves these objectives relates to a data processing apparatus comprising issuing means for issuing a request for data loading to a server, display

means for displaying display data received in response
to the request, and control means adapted, in case an
estimated end time for data generation is received
together with the display data, to so control said

5   issuing means as to issue again the request for data
loading when said end time is reached.

According to still another aspect, the present
invention which achieves these objectives relates to a
computer readable storage medium storing a data

10   processing program for controlling a computer perform
data processing, the program comprising codes for
causing the computer to perform a reception step of
receiving a request for data loading from a terminal,
an end discrimination step of discriminating whether

15   the generation of requested data is ended, a first
transmission step adapted, if the generation of the
requested data is ended, to transmit such data, an
estimation step adapted, if the generation of the
requested data is not ended, to estimate the end time,

20   and a second transmission step of transmitting the
estimated end time together with display information
indicating that the data generation is in progress.

According to still another aspect, the present
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causing the computer to perform an issuing step of issuing a request for data loading to a server, a display step of displaying display data received in response to the request, and a re-issuing step adapted,

5 in case the estimated end time of data generation is received together with the display data, to re-issue the request for data loading when such end time is reached.

Other objectives and advantages besides those

10 discussed above shall be apparent to those skilled in the art from the description of a preferred embodiment of the invention which follows. In the description, reference is made to accompanying drawings, which form a part thereof, and which illustrate an example of the

15 invention. Such example, however, is not exhaustive of the various embodiments of the invention, and therefore reference is made to the claims which following the description for determining the scope of the invention.

20 BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a block diagram showing the configuration of a navigation system relating to a first embodiment;

Fig. 2 is a flow chart showing the operation

25 sequence of a server;

Fig. 3 is a view showing the content of display of received data in an information processing terminal;

Fig. 4 is a flow chart showing the operation sequence for obtaining an estimated process end time;

Fig. 5 is a view showing the content of memory for obtaining the estimated process end time;

5 Figs. 6A and 6B are views showing a conventional periodic data loading request;

Fig. 7 is a view showing the content of display of the information processing terminal in a second embodiment;

10 Fig. 8 is a block diagram showing the hardware configuration of the information processing terminal; and

Fig. 9 is a flow chart showing the operation sequence of the information processing terminal.

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DESCRIPTION OF THE PREFERRED EMBODIMENTS

In the following there will be explained in detail a preferred embodiment of the present invention, with reference to the attached drawings.

20 [First embodiment]

Fig. 1 is a block diagram showing the configuration of a navigation system constituting a first embodiment of the present invention, wherein an information processing terminal 101 is composed for

25 example of a personal computer and is connected with a server 103 through a data transfer path 102. A data storage device 105 is composed for example of a hard

disk, and is connected with the server 103 through a data transfer path 104.

Fig. 8 is a block diagram showing the configuration of the information processing terminal 101.

In Fig. 8, an input unit 801 is composed of a keyboard or a pointing device, and is used by the user for entering data and commands. An external memory unit 802 is composed of a memory device utilizing for example a hard disk as the memory medium, and is used for storing data loaded from the server 103. A display unit 803 is composed for example of a CRT or a liquid crystal display device, and is used for displaying a page generated in the server 103 or the result of processing.

A CPU 804 controls various units of the apparatus and reads and executes a program, thereby realizing various processes. A ROM 805 is used for storing fixed data and programs. A control program for realizing a process sequence, to be explained later with reference to a flow chart shown in Fig. 9, may be stored in the ROM 805 or read from the external memory unit 802. A RAM 806 provides a work area required for the processing of the present apparatus. A communication I/F 807, which is an interface for communication, is connected with the data transfer path 102. A bus 808 connects various units.

The server 103 also has a hardware configuration similar to that of the information processing terminal 101, and a control program for realizing the process sequence to be explained later with reference to flow charts in Figs. 2 and 4 is stored in a ROM or an external memory unit.

The user or a program on the information processing terminal 101 issues a request for data loading from the information processing terminal 101 to the server 103 through the data transfer path 102. In response to the request, the server 103 prepares the requested data and stores the data in the data storage device 105.

The present embodiment is featured by a fact that the data loading is not postponed until the completion of data preparation, but a display page is returned to the information processing terminal 101 according to the data generation time.

In case the process time is shorter than a predetermined time, the display page is immediately returned to the information processing terminal 101, but, in case the process time is longer than the predetermined time, a page including information for automatically requesting the data loading again at the estimated process end time is returned to the information processing terminal 101.

In either case, the information processing

terminal 101 can obtain, from the server 103, the
display page itself or information indicating that the
process requires time, at a time within the
predetermined time.

5   The function of the server 103 of the above-
described configuration will be explained with
reference to a flow chart shown in Fig. 2.

At first a step S201 waits until the request for
data loading is acquired from the information
10   processing terminal 101. When the request is acquired,
a step S202 checks the data storage device 105 to
discriminate whether the generation of the requested
data has ended. If ended, a step S203 reads the
desired data from the data storage device 105 and
15   transmits the data to the information processing
terminal 101 through the data transfer path 102,
whereupon the process is terminated.

On the other hand, if the step S202 identifies
that the generation of the requested data has not
20   ended, a step S204 estimates the time to the end of
data generation by calculation, and generates a display
page in which the estimated time is added. Then a step
S205 transmits the generated display page to the
information processing terminal 101 through the data
25   transfer path 102, whereupon the process is terminated.

In the following the function of the information
processing terminal 101 will be explained with

reference to a flow chart shown in Fig. 9.

At first a step S901 issues a request for data
loading to the server 103. A step S902 displays the
page received from the server 103 in response to the

5   request, on the display unit 803. If a step S903
receives, together with the display page, re-loading
information for automatically requesting the data
loading again at the estimated process end time, the
sequence proceeds to a step S904. If such information

10   is not received, the process is terminated as the
desired page has been received. A step S904 waits
until the estimated end time, and, when such end time
is reached, the sequence returns to the step S901 to
request the data loading again.

15   Fig. 3 is a view showing the content of display of
the received data in the information processing
terminal 101 of the present embodiment. A page 301 is
the display frame in case the processing does not take
time in a system executing request for data processing

20   or data loading by hyperlink. On the other hand, a
page 302 is the display frame in case the processing
takes time. The page 302 automatically request data
loading immediately after the estimated process end
time. If the generation of the requested data has

25   ended at the transmission of the second request to the
server 103, the page 301 is displayed.

In the following there will be explained, with

reference to a flow chart in Fig. 4 and Fig. 5 showing

the memory area of the data storage device 105, the

calculation procedure for the estimated process end

time of data generation executed on the server 103.

5   Referring to Fig. 4, a step S401 stores the

"generation start time" in an area 502, within an area

501 shown in Fig. 5. A next step S402 stores the

"final size approximate estimate data" in an area 503

within the area 501. For example, in case of image

10   data, the final size can be calculated by "width ×

height × bit depth" of the image.

As an example of approximately estimating the time

to the completion from a given time, there can be shown

the following arithmetic calculation, utilizing the

15   values stored in the areas 502, 503 and the size of the

data prepared up to the current time:

"estimate of final size" × ("current time" −

"generation start time") ÷ "size generated up to a

given time" = "time to completion at the given time",

20   estimated end time = "current time" + "time to

completion at the given time".

The present embodiment is featured by a fact that

the time obtained as explained above is set in the page

302 shown in Fig. 3, as the time for next request for

25   data loading.

The information processing terminal 101 displays

the page 302, shown in Fig. 3, on the image display

device, and the user may leave the display to automatically execute request for data loading again, or may execute another request by canceling the data loading.

5   As explained in the foregoing, the present embodiment estimates the end time of data generation and executes request for data loading at the estimated end time, so that there will not result the wasted request for data loading or the wasted waiting time
10   explained in relation to Figs. 6A and 7B.

[Second embodiment]

In the following there will be explained a second embodiment of the present invention with reference to Fig. 7. As the basic configuration of the navigation
15   apparatus of the present embodiment is same as that of the first embodiment shown in Fig. 1, reference is to be made to Fig. 1 as regards the configuration of the present embodiment.

The present embodiment is applied to the display
20   of result in case the server executes a time-consuming process such as printing, fax transmission or mail transmission.

The information processing terminal 101 can continue another process without waiting for the
25   completion of the transmitted request.

Fig. 7 shows the content of display in the information processing terminal 101 of the present

embodiment. In case the process in the server does not take a long time, a page 701 indicating the result of process is displayed on the display unit 803 of the information processing terminal 101. On the other

5   hand, in case the process in the server takes a long time, the time to the end of process is approximately estimated and a page 702 indicating that the process is in progress is displayed on the display unit 803 of the information processing terminal 101. The page 702 sets

10   the end time of the process based on the estimated time, the display of the page indicating the result is requested at thus set time.

In case the result is available in response to the repeated request, the result is displayed by the page

15   701 on the display unit 803 of the information processing terminal 101. In case the result is not available, the server again estimates the time to the end of process, and display the page 702 on the image display device of the information processing terminal

20   101.

In the above-described navigation apparatus of the present embodiment, process can be executed effectively without the wasteful waiting time or wasteful request for data loading in the information processing

25   terminal, particularly in case a page is dynamically generated and displayed in the image display device of the information processing terminal or in case of

executing a time-consuming process in the server.

The present invention may be applied to a system consisting of plural equipment (for example host computer, interface devices, display device, etc.) or

5   an apparatus consisting of a single equipment, within an extent that the functions of the foregoing embodiments can be realized.

Also the present invention includes a case where the program codes of a software realizing the functions

10   of the aforementioned embodiments are supplied to a computer of a system or an apparatus connected to various devices in order to operate the devices so as to realize the functions of the aforementioned embodiments and the functions of the aforementioned

15   embodiments are realized by operating the devices by the computer (CPU or MPU) of the above-mentioned system or apparatus according to the program codes. In such case the program codes themselves of the software realize the functions of the aforementioned

20   embodiments, and the program codes themselves and the means for supplying the computer with such program codes, for example a memory medium storing the program codes, constitutes the present invention.

The memory medium storing such program codes can

25   be, for example, a floppy disk, a hard disk, an optical disk, a magnetooptical disk, a CD-ROM, a CD-R, a magnetic tape, a non-volatile memory card or a ROM.

The present invention also includes such program codes not only a case where the functions of the aforementioned embodiments are realized by the execution of the read program codes by the computer but

5   also a case where an operating system or the like functioning on the computer executes all or a part of the actual processes under the control of such program codes thereby realizing the functions of the aforementioned embodiments.

10   The present invention further includes a case wherein the program codes read from the memory medium are once stored in a memory provided in a function expansion board inserted into the computer or a function expansion unit connected to the computer, and

15   a CPU provided in the function expansion board or the function expansion unit executes all the process or a part thereof according to the instructions of such program codes, thereby realizing the functions of the aforementioned embodiments.

20   In case the present invention is applied to the above-described memory medium, program codes corresponding to the aforementioned flow charts may be stored in such memory medium.

Although the present invention has been described

25   in its preferred form with a certain degree of particularity, many apparently widely different embodiments of the invention can be made without

departing from the spirit and the scope thereof. It is to be understood that the invention is not limited to the specific embodiments thereof except as defined in the appended claims.